

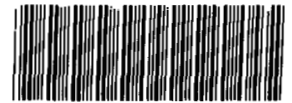
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Department of Energy

ROCKY FLATS OFFICE  
P O BOX 928  
GOLDEN COLORADO 80402-0928



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94 DOE 02772

ACTION

DIST. NC

BIRMAN, H S	
CARNIVAL, G J	
COPP, R D	
CORQUA, R C	
DAVIS, J G	
FERRERA, D W	
FRANZ, W A	
HANN, B J	
HEALY, T J	
H-DAHL, T G	
HILBIG, J G	
HUTCINS, N M	
KELL, R E	
KIRBY, W A	
KUSNER, A W	
MAHAFFEY, J W	
MAHN, H P	
MARX, G E	
M KENNA, F G	XX
MORGAN, R V	
PIZZUTO, V M	
POTTER, G L	
SANDLIN, N B	
SATTERWHITE, D G	
SCHUBERT, A L	
SETLOCK, G H	
STIGER, S G	XX
SULLIVAN, M T	
SWANSON, E R	
WILKINSON, R B	
WILSON, J M	

Busby WXX  
Houk RXX  
Hopkins JXX

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Mr Gary Baughman  
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Gentlemen

We have been working with your staff to resolve comments on the Operable Unit 1 (881 Hillside) proposed Final Phase III RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report. Our respective staffs have resolved all comments except the elimination of antimony (Sb) and manganese (Mn) as OU1 site contaminants. As agreed in the February 15, 1994 teleconference between our staffs, the Gilbert Screening Process was applied to Sb and Mn. Based upon the Gilbert Screening, Sb and Mn should still be eliminated as OU1 site contaminants. Enclosure 1 presents background on this issue and Enclosure 2 presents a summary of the Gilbert Analysis and Recommendations (a full report detailing the results of the Gilbert Process will be submitted in the near future). Regardless, your staff has indicated that they still expect Sb and Mn to be added as contaminants and further evaluated in the Baseline Risk Assessment. We are concerned because (1) you are suggesting we make an exception from an approved technically valid process to address these chemicals and (2) Sb and Mn will be carried through to the Corrective Measures Study/Feasibility Study (CMS/FS) where corrective/remedial technology alternatives would need to be developed and considered.

As provided for in the Risk Assessment Guidance for Superfund (RAGS) and as a compromise position, we are willing to calculate the health risks posed by Sb and Mn and to present and discuss these risks as part of the RFI/RI Report Uncertainty Analysis in the Public Health Evaluation. Furthermore, we will thoroughly discuss the possible consequences that exclusion of Sb and Mn have on the Baseline Risk Assessment. We feel that the Uncertainty Analysis is the appropriate place for the discussion of Sb and Mn given that (1) they were eliminated by an approved procedure and (2) this approach is suggested by the RAGS sections 5.7 and 8.4.1. We believe that arbitrarily deviating from the approved process with no clear technical justification is inappropriate and unsupportable.

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ADMIN RECORD

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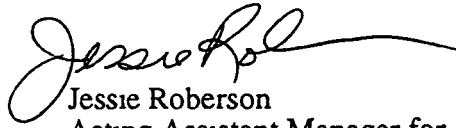
G Baughman & M Hestmark  
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The inability to resolve the issue of the use of professional judgment for Sb and Mn is currently impacting the OU1 schedule for completion of Technical Memorandum 10 (Development of Remedial Action Objectives). To date the detailed schedules have been impacted (seven weeks for the submittal of the finalized version of Technical Memorandum 10). If we cannot immediately resolve this issue we believe it may be appropriate to request a work stoppage order as per Part 24 (Work Stoppage) of the Interagency Agreement so that this issue can be resolved. Regardless once resolved we will need to revise the OU1 milestone schedules because the delays already experienced constitute good cause.

We wish to meet with you and your staffs in the near future in order to resolve this issue. If you have any questions you may direct them to Scott Grace at 966 7199.

Sincerely

  
Jessie Roberson  
Acting Assistant Manager for  
Environmental Restoration

Enclosure

cc w/Enclosures  
A Rampertaap EM 453  
M Silverman OOM RFO  
L Smith OOM RFO  
M Roy OCC RFO  
T Reeves ER RFO  
W Busby EG&G  
R Houk EG&G  
J Hopkins EG&G  
G Kleeman EPA  
J Schieffelin CDH  
J Swanson CDH

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Enclosure 1  
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#### Background on the OU1 Antimony and Manganese Issue

January 12 1994 letter from EPA/CDH transmitting comments on the Final Phase III RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report indicated that the revised Final RFI/RI Report should be submitted one month after receiving comments DOE received the January 12 comments February 1 1994

Sb and Mn were eliminated as contaminants based on the procedures (providing for professional judgment) described in Appendix D (Determination of Contaminants) of the November 5 1993 Final Phase III RFI/RI Report The procedure was agreed to by EPA and CDH as most recently stated in the January 12 1994 EPA/CDH letter

In the January 12 comments EPA has requested that the inorganic elements antimony (Sb) be added as contaminants for OU1 and further evaluated as Contaminants of Concern (COCs) in the Baseline Risk Assessment

Several meetings were held to resolve the January 12 comments Meetings previous to the January 12 letter were held to discuss pre decisional comments These were held December 10 17 1993 and January 25 1994 The most recent discussions were held during a teleconference on February 15 1994 where it was agreed to apply the Gilbert Screening Process to Sb and Mn

DOE performed the Gilbert Screening Process with the following conclusion The detailed report is currently being reviewed and finalized

The results were inconclusive and possibly invalid because of the very small number of detects in the background data for Sb and because of extremely large variances associated with both the background and site data for both Sb and Mn These factors make the likelihood of Type I (false positive) statistical errors extremely high Spatial and temporal considerations and the use of professional judgment (which is also stressed as being part of the Gilbert Process) suggests that Sb and Mn are naturally occurring (see enclosure 2)

Enclosure 2 summaries in more detail the Gilbert Analysis

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Enclosure 2  
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### **Summary of Gilbert Analysis and Recommendations Antimony**

The detection rate for Sb in background is generally less than 20 to 30 percent applying inferential statistics to such highly censored data sets is inappropriate and misleading. As noted by Helsel (1990) for highly censored data sets the outcome of the statistical tests is strongly dependent on the value substituted<sup>1</sup>. Helsel (1990) states that fabrication of data followed by a t test must be considered too arbitrary for use especially for legal or management decision purposes and should be avoided.

Although RFP derived Sb contamination is suggested by some statistical tests that indicate a statistically significant difference from background the use of inferential statistics is grossly inappropriate and misleading because of the low rate of detection in the data sets. Professional judgment must be used to assess whether or not Sb should be retained as a PCOC.

The low rate of UTL exceedances (less than 10 to 15 percent using the 1993 background data set) combined with the lack of spatial and temporal consistency of most exceedances argues against classification of Sb as a PCOC. In particular the detections of Sb in the UHSU are consistently less than the contract required detection limit (CRDL) of 60 ug/L. Because any OU related contamination would necessarily need to migrate downward through the UHSU to impact the LHSU a lack of high values (i.e. values greater than the CRDL) in the UHSU groundwater is inconsistent with the assertion that high concentrations of Sb in LHSU groundwater are the result of derived Sb contamination.

Based on hydrogeology, geochemistry and geology as well as the spatial and temporal distribution of Sb in OU1 it is recommended that Sb not be considered as a contaminant of concern in LHSU groundwater at OU1.

### **Summary of Gilbert Analysis and Recommendations Manganese**

The results of the statistical tests are inconsistent for UHSU and LHSU groundwater. The slippage test indicates no significant difference between the background and OU1 populations whereas the Gehan test, quantile test and t test do indicate a significant difference. These conflicting results suggest that the data should be reviewed carefully by geologist, geochemists and hydrogeologists (Phase B of the Gilbert methodology) to ascertain the real meaning of the conflicting statistical results.

Examination of the spatial and temporal distribution of the Mn results indicates that there is no well defined source. The high concentrations of Mn are scattered across the site without any spatial relationship to the IHSS's within OU1. In addition the data from successive quarters for any one well show that the occurrence of high concentrations appear random. Locations for which at least four results were available were subjected to this temporal analysis; none showed consistently high concentrations of Mn. The large disparity in concentration values from one sampling period to the next is inconsistent with the presence of real contamination.

Sitewide geologic investigations in which numerous drill cores have been examined indicate the pervasive presence of Mn and Fe oxides along fractures and faults. The

paragenesis (the timing of oxide deposition) of these fracture fill materials have not yet been determined but the oxides may be out of equilibrium with current groundwater conditions. This proposed disequilibrium may result in the current day dissolution of Mn oxides which in turn may result in locally high concentrations of Mn in groundwater. For example, disequilibrium due to a decrease in Eh (oxidation potential) or pH will increase the solubility of Mn oxides.

Because of the localized concentration of Mn oxides along fractures, the geologic conditions at the site will greatly affect Mn concentrations in groundwater. If the geologic units at the site are more intensely fractured or faulted than in background areas, real differences in Mn concentrations may exist, but these differences are not indicative of contamination. Based on reliable data from core logs and geophysical logs, geologists have located a fault along the edge of the 881 Hillside. The fault surfaces, as well as related fracture surfaces, are coated with Mn oxides. This presents a strong geologic argument as to why Mn should definitely not be considered as a contaminant at OU1.

In conclusion, although RFP derived Mn contamination is suggested by some statistical tests which indicate a statistically significant difference from background for Mn concentrations in groundwater at OU1, Mn should be eliminated from consideration as a PCOC based on hydrogeochemical and geologic evaluations. In addition, the spatial and temporal distribution of Mn in OU1 is inconsistent with contamination from a point source.

(NOTE: All Mn data but one record were validated; all validated results were acceptable; none were rejected.)

## Reference

Helsel D R (1990) Less than obvious statistical treatment of data below the detection limit. *Environmental Science & Technology* v 24 no 12 p1766-1774